

WHAT IS CLAIMED IS:

1. A network storage virtualization method in a network storage system having a plurality of network storage devices, said method comprising:

allowing a client connected via a network to access the network
5 storage devices as one virtual network storage system; and
permitting said client to access the network storage devices separate
from said virtualized network storage system.

2. A network storage virtualization method according to claim 1,
10 wherein a first network storage device includes a disk interface (I/F) which is
connected to an apparatus having a function of forming said network storage
devices as one virtual network storage device, and

wherein a second network storage device includes a disk I/F which is
connected to said apparatus having a function of forming said network
15 storage devices as one virtual network storage device and a host I/F which is
connectable to an external device so as to permit said external device to
access the network storage devices separate from said apparatus having a
function of forming said network storage devices as one virtual network
storage device.

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3. A network storage virtualization method according to claim 2,
wherein said external device is permitted to access a secondary volume
which is a copy of a primary volume and not permitted to access volumes
other than said secondary volume.

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4. A network storage virtualization method according to claim 3,
wherein said external device accesses said secondary volume via said host
I/F of said second network storage device.

5 5. A network storage virtualization method according to claim 4,
wherein a storage area network (SAN) is connected between said external
device and said host I/F of said second network storage device.

6. A network storage virtualization method according to claim 1,
10 wherein a first network storage device includes a disk interface (I/F) which is
connected to an apparatus having a function of forming said network storage
devices as one virtual network storage device, and
wherein a second network storage device includes a first host I/F which
is connected to said apparatus having a function of forming said network
15 storage devices as one virtual network storage device and a second host I/F
which is connectable to an external device so as to permit said external
device to access the network storage devices separate from said apparatus
having a function of forming said network storage devices as one virtual
network storage device.

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7. A network storage virtualization method according to claim 6,
wherein said external device is permitted to access a secondary volume
which is a copy of a primary volume and not permitted to access volumes
other than said secondary volume.

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8. A network storage virtualization method according to claim 7,
wherein said external device accesses said secondary volume via said
second host I/F of said second network storage device.

5 9. A network storage virtualization method according to claim 8,
wherein a storage area network (SAN) is connected between said external
device and said second host I/F of said second network storage device.

10 10. A network storage virtualization method according to claim 8,
wherein a wide storage area network (WSAN) is connected between said
apparatus having a function of forming said network storage devices as one
virtual network storage device and said first host I/F of said second network
storage device.

15 11. A network storage virtualization method according to claim 3,
further comprising the step of:

configuring access control of said secondary volume from outside of
said apparatus having a function of forming said network storage devices as
one virtual network storage device.

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12. A network storage virtualization method according to claim 11,
wherein said configuring step comprises the steps of:

creating a mirroring pair between said primary volume and said
secondary volume at a certain point in time by taking a complete initial copy of

said primary volume and storing said complete initial copy in said secondary volume;

receiving in said second storage device a suspend request;

placing the mirroring pair into a suspend status to permit setting of the

5 access control according to user selection;

If the user chooses a read only mode, setting said secondary volume to the read only mode for input/output (I/O) requests from said external device and re-synchronizing the mirroring pair; and

if the user chooses a read/write mode, setting said secondary volume
10 the read/write mode for input/output (I/O) requests from said external device and re-synchronizing the mirroring pair.

13. A network storage virtualization method according to claim 12, wherein when said secondary volume is set to the read only mode access to
15 said secondary volume is performed according to the steps of:

suspending synchronization of the mirroring pair including said primary volume and said secondary volume;

permitting access to data on said secondary volume in response to an I/O request via the host I/F; and

20 upon completion of said access, re-synchronizing the mirroring pair.

14. A network storage virtualization method according to claim 12, wherein when said secondary volume is set to the read/write mode access to said secondary volume is performed according to the steps of:

suspending synchronization of the mirroring pair including said primary volume and said secondary volume;

permitting access to data on said secondary volume in response to an I/O request via the host I/F; and

5 upon completion of said access, re-synchronizing the mirroring pair.

15. A storage system comprising:

a first network storage device which includes a primary volume;

a second network storage device which includes a secondary volume

10 which is a copied volume of the primary volume and volumes other than the secondary volume; and

a virtualization apparatus, which is connected to each of said first and second network storage devices, and allows a client connected via a network to access the network storage devices as one virtual network storage system

15 wherein said client is permitted to access the network storage devices separate from said virtualization apparatus.

16. A storage system according to claim 15, wherein said first network storage device includes a disk interface (I/F) which is connected to
20 virtualization apparatus, and

wherein a second network storage device includes a disk I/F which is connected to said virtualization apparatus and a host I/F which is connectable to an external device so as to permit said external device to access the network storage devices separate from said virtualization apparatus.

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17. A storage system according to claim 16, wherein said external device is permitted to access said secondary volume which is a copy of said primary volume and not permitted to access said volumes other than said secondary volume.

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18. A storage system according to claim 17, wherein said external device accesses said secondary volume via said host I/F of said second network storage device.

10 19. A storage system according to claim 18, wherein a storage area network (SAN) is connected between said external device and said host I/F of said second network storage device.

20. A storage system according to claim 15, wherein said first network storage device includes a disk interface (I/F) which is connected to said virtualization apparatus, and

wherein said second network storage device includes a first host I/F which is connected to said virtualization apparatus and a second host I/F which is connectable to an external device so as to permit said external device to access the network storage devices separate from said virtualization apparatus.

21. A storage system according to claim 20, wherein said external device is permitted to access said secondary volume which is a copy of said

primary volume and not permitted to access said volumes other than said secondary volume.

22. A storage system according to claim 21, wherein said external
5 device accesses said secondary volume via said second host I/F of said second network storage device.

23. A storage system according to claim 22, wherein a storage area
network (SAN) is connected between said external device and said second
10 host I/F of said second network storage device.

24. A storage system according to claim 22, wherein a wide storage
area network (WSAN) is connected between said virtualization apparatus and
said first host I/F of said second network storage device.

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25. A storage system according to claim 17, wherein access control
of said secondary volume is configured from outside of said virtualization
apparatus.

20 26. A storage system according to claim 25, wherein said access control of said secondary volume is configured by creating a mirroring pair between said primary volume and said secondary volume at a certain point in time by taking a complete initial copy of said primary volume and storing said complete initial copy in said secondary volume, receiving in said second
25 storage device a suspend request, placing the mirroring pair into a suspend

status to permit setting of the access control according to user selection, If the user chooses a read only mode, setting said secondary volume to the read only mode for input/output (I/O) requests from said external device and re-synchronizing the mirroring pair, and if the user chooses a read/write mode, setting said secondary volume the read/write mode for input/output (I/O) requests from said external device and re-synchronizing the mirroring pair.

27. A storage system according to claim 26, wherein when said secondary volume is set to the read only mode access to said secondary volume is performed by suspending synchronization of the mirroring pair including said primary volume and said secondary volume, permitting access to data on said secondary volume in response to an I/O request via the host I/F, and upon completion of said access, re-synchronizing the mirroring pair.

28. A storage system according to claim 26, wherein when said secondary volume is set to the read/write mode access to said secondary volume is performed by suspending synchronization of the mirroring pair including said primary volume and said secondary volume, permitting access to data on said secondary volume in response to an I/O request via the host I/F, and upon completion of said access, re-synchronizing the mirroring pair.